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Deep Draft Composite Fender Lessons Learned

Jeff Green
NSWCCD
2-9-05

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Problem

- Existing ship-to-lighter fenders not SS3 capable
  - Failures
  - Interface issues due to different lighter shapes & sizes

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Project Goals

- Develop new fender concept
  - Work with all current lighters
  - Improved capacity
  - Low maintenance
  - SS3 deployment & operation

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Design Requirements

- Compatible with common JLOTS ships, lighters, and platforms
- Transportable, ISO compatible
- Deployment & recovery with common lift equipment
- Sufficient standoff

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Deep Draft Composite Fender

Principal Characteristics, Transport & Stowed

Length.....
....38’

Width.....
.....6’

Height.....
8’

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Deep Draft Composite Fender

Principal Characteristics, Deployed

Length.....
....17’

Width....
.....6’

Height.....
18’

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Testing

- Fall ‘02
  - Handling & deployme
  - HSV X-1 Joint Venture

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Testing

video

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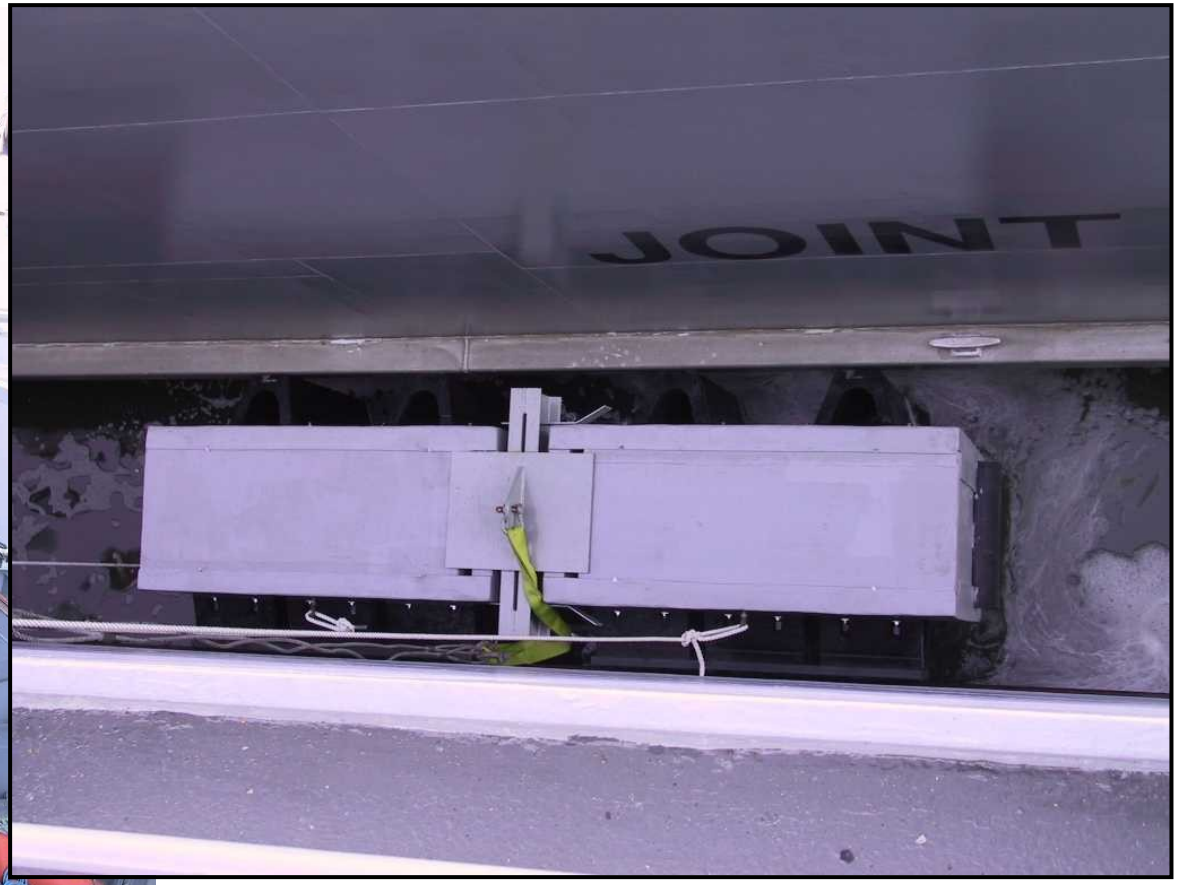
Testing



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Results

- Deployment & mooring methods unsatisfactory
  - Difficult deployment
  - Mooring line rigging
  - Spreader bar

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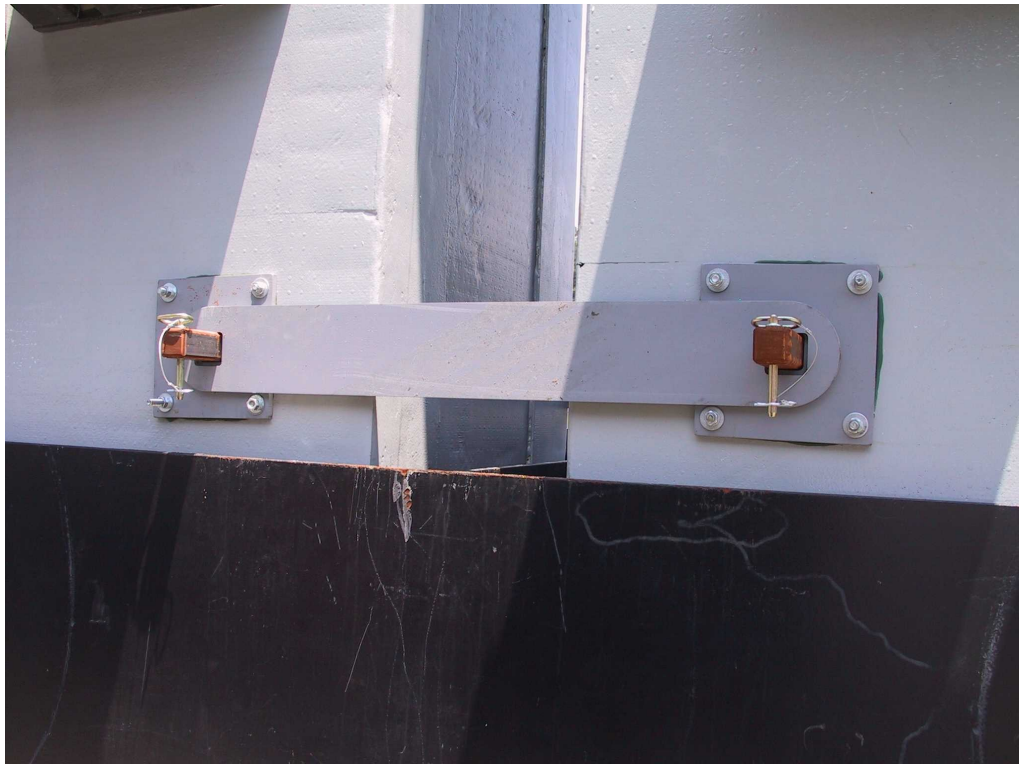
Design Changes

- New lifting, securing, & mooring



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Testing

- Fall ‘03
  - At-Sea test
  - LCU-2000, LCM-8

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Testing

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Results

- Mooring method successful
- Deployment time consuming but acceptable
- Interface w/lighters successful
- Locking mechanism damaged

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Design Changes

- Improved locking system

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Testing

- Spring ‘04
  - At-Sea test at JLOTS 04 in Honduras

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Testing

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Testing

- Video

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Results

- Sea state problems
  - Erratic motions in SS3
- Personnel transfer complicated
  - 6’ standoff

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Were Goals Met?

- Work with all current lighters?
  - Tested with LCU-2000, LCM-9, NL CWF
    - Rub rails
    - CWF bolts & corners
- Improved capacity?
  - Cushion elements sufficiently sized

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Were Goals Met?

- Low maintenance?
  - No corrosion problems
  - Localized composite & cushion damage
  - Missing bolts
- SS3 operation?
  - Erratic motions
  - Related mooring issue

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Were Goals Met?

- Transportable?
  - Transported by truck & ship
  - Handled with forklifts, cranes
- ISO compatible?
  - Fit ISO 8x8x40 size

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Were Goals Met?

- Deployment & recovery with common lift equipment?
  - Cargo crane & standard lifting gear
- Sufficient standoff?
- ~6 out of 8 ain't bad, but room for improvement

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Improvements & Future Considerations

- Motions
  - Restraints
  - Design
- Cushion height
- Composite protection
- Cushion resilience

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Key Lessons Learned

- Reconsider requirements
  - Ship mods
  - SS3 deployment & recovery
- Early user input

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Questions?